Package Selection
Marking
and
Labeling Requirements
Objectives

- Identify Applicable Parts of Hazardous Materials Regulations (HMR)
- Describe United Nations (UN) Packaging Standards and Codes
- Determine Hazard Communication Marking and Labels
HM215J and UN Harmonization Labels

§172.446
Line

§172.448
No Line

Text Changes

Old

New

§172.448
HM215J and UN Harmonization
Markings

Marine Pollutant
§172.322

Old

New

Non-Stackable IBC
§178.703

Stackable IBC
§178.703

Excepted Quantities
§173.4a
Limited Quantities and ORM-D

CONSUMER COMMODITY

ORM-D

For use in modes other than air until December 31, 2020

Limited quantities for modes other than air (see § 172.315(a))

Limited quantities by air (see § 172.315(b))
HMR 49 CFR

- Part 172 – Subparts B, D and E
- Part 173
- Part 178 – Subpart L and M
Is The Material Hazardous?

- Check Table §172.101 (HMT)
- Identify the HM by Proper Shipping Name – Column 2

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Hazardous Materials Descriptions and Proper Shipping Names</th>
<th>Hazard Class or Division</th>
<th>Identification Numbers</th>
<th>PG</th>
<th>Label Codes</th>
<th>Special Provisions (§172.102)</th>
<th>(8) Packaging (§173.***</th>
<th>(9) Quantity Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acrolein, stabilized</td>
<td>6.1</td>
<td>UN1092</td>
<td>I</td>
<td>6.1, 3</td>
<td>1, B9, B14, B30, B42, B72, B77, T22, TP2, TP7, TP13, TP38, TP44</td>
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<td>226, 244</td>
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<tr>
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<td>Copper cyanide</td>
<td>6.1</td>
<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
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<td>204, 242</td>
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<tr>
<td>G</td>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
<td>UN1993</td>
<td>I</td>
<td>3</td>
<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
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<td>Dangerous Goods in Machinery</td>
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<td></td>
<td>136, A105</td>
<td></td>
<td>None</td>
<td>222</td>
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</tbody>
</table>

Exceptions

- Non-bulk (8B)
- Bulk (8C)
- Passenger aircraft/rail (9A)
- Cargo aircraft only (9B)

*Note: The table includes specific exceptions and quantity limitations for each hazardous material.*
# Column 8 Packaging (173.***)

<table>
<thead>
<tr>
<th>Symbols (1)</th>
<th>Hazardous Materials Descriptions and Proper Shipping Names (2)</th>
<th>Hazard Class or Division (3)</th>
<th>Identification Numbers (4)</th>
<th>PG (5)</th>
<th>Label Codes (6)</th>
<th>Special Provisions (§172.102) (7)</th>
<th>(8) Packaging (§173.***), Exclusions (8A), Non-bulk (8B), Bulk (8C)</th>
<th>(9) Quantity Limitations, Passenger aircraft/rail (9A), Cargo aircraft only (9B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acrolein, stabilized</td>
<td>6.1</td>
<td>UN1092</td>
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<td>6.1, 3</td>
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<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
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<tr>
<td>G</td>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
<td>UN1993</td>
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<td></td>
<td>Dangerous Goods in Machinery</td>
<td>9</td>
<td>UN3363</td>
<td>136, A105</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>222</td>
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</tbody>
</table>
§173.203
Non-Bulk Packagings for Liquid Hazardous Materials in Packing Group III

- Combination Packagings
- Single Packagings

1A2 STEEL DRUM
removable head used as combination packaging

FIBERBOARD BOX
used as combination packaging showing inner packagings

1A1 STEEL DRUM
non-removable head used as single packaging
Other Requirements of §173.203

- Packaging Conforms to Subpart B of Part 173
- Packaging Meets Requirements of Part 178 at PG I, II or III level
- Special Provisions of Column 7, HMT are Met
### Column 7 Special Provisions

<table>
<thead>
<tr>
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<td>Acrolein, stabilized</td>
<td>6.1</td>
<td>UN1092</td>
<td>I</td>
<td>6.1, 3</td>
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<td>Copper cyanide</td>
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<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
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<td>204 242</td>
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<tr>
<td>G</td>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
<td>UN1993</td>
<td>I</td>
<td>3</td>
<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
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<td>II</td>
<td>3</td>
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<td>III</td>
<td>3</td>
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<td>8</td>
<td>A7, IB3, N34, T4, TP1</td>
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</tbody>
</table>
Column 7 Special Provisions

- Identifies additional provisions for the specific hazardous material
  - “1” means poisonous by inhalation, Hazard Zone A
- May impose limitations or additional requirements on packaging
  - A7 requires steel packaging to be corrosion resistant when shipped by air
  - N34 requires aluminum constructed materials not in contact with the hazardous material
Performance-Oriented Packaging

1A2 STEEL DRUM
used as combination packaging

1A1 STEEL DRUM
used as single packaging
Required Tests for Non-Bulk Packagings and Packages

- **Drop Test – §178.603**
  - All packagings

- **Leakproofness Test – §178.604**
  - All packagings intended for liquids

- **Hydrostatic Test – §178.605**
  - Metal, plastic and composite intended for liquids

- **Stacking Test – §178.606**
  - All packaging other than bags

- **Vibration Standard – §178.608**
  - All packaging
Closure Requirements

DOT Specification or UN standard packaging must be closed in accordance with the instructions provided by the packaging manufacturer or subsequent distributor.

§173.22 (a)(4)
Manufacturer’s Responsibility

§178.2(c) *paraphrased*
...the manufacturer...of that packaging must:
specifying the type(s) and dimensions of the closures, including gaskets and any other components needed to ensure that the packaging is capable of successfully passing the applicable performance tests.
§178.2(c) *paraphrased*
This information must include any procedures to be followed, including closure instructions for inner packagings and receptacles, to effectively assemble and close the packaging for the purpose of preventing leakage in transportation. *Closure instructions must provide for a consistent and repeatable means of closure that is sufficient to ensure the packaging is closed in the same manner as it was tested.*
Closure Notifications

• Types of Notifications
  - Written
  - Embossed
  - Printed on the Package

Closure Instructions

1. SEAL PAINT CANS:
   FOR GROUND SHIPMENTS ONLY, ATTACH 6 CAN CLIPS.
   FOR AIR OR GROUND SHIPMENTS, SEAL WITH LOCKING RING.
   (LOCKING RING REQUIRED FOR AIR SHIPMENTS)

2. IF SHIPPING 1 UNIT, SEAL 1 CAN AND ASSEMBLE SINGLE SHIPMENT
   CORRUGATED BOX.
   IF SHIPPING 2 UNITS, SEAL 2 CANS AND ASSEMBLE 2 PACK CORRUGATED
   BOX.
   IF SHIPPING 4 UNITS, SEAL 4 CANS AND ASSEMBLE 4 PACK CORRUGATED
   BOX.

3. PLACE EPS FOAM CAP INSERTS INTO BASE OF BOX.
4. PUT FILLED CAN/CANS IN EPS FOAM CAP INSERTS.
5. PLACE EPS FOAM CAP INSERTS ON TOP OF CAN/CANS.
6. TAPE BOX CLOSED WITH 2" RENEFORCED GUMMED TAPE OR MINIMUM 2 MIL
   2" CLEAR CARTON SEALING TAPE.

ATTENTION
To seal can:
- Apply downward pressure to lid until seated completely into grooves on can.
- Air: Apply downward pressure to locking ring until contacting top of can.
- Ground: Lock clips into grooves on can in an evenly spaced pattern.
- Outer flaps meet, use center seam tape pattern 2.5” min. overlap

SINGLE KIT CONTAINS: ONE SINGLE SHIPMENT CARTON AND 2 EPS FOAM CAPS.
2 PACK KIT CONTAINS: ONE 2 PACK CARTON AND 4 EPS FOAM CAPS.
4 PACK KIT CONTAINS: ONE 4 PACK CARTON AND 8 EPS FOAM CAPS.

**LPS WILL ASSUME RESPONSIBILITY FOR PACKAGE INTEGRITY AND COMPLIANCE WITH ICAO/ATA, IMDG AND UN
STANDARDS, “ONLY”, IF ALL PACKAGE COMPONENTS ARE ASSEMBLED AND PURCHASED AS A SINGLE INTEGRATED UNI.
Embossed
Printed on Package

- ELOGUE INSTRUCTIONS:
  1. BOTTLE TO BE SEALED WITH 39-49mm Saf-Cap CRC F-217
     INSTALLED OR FLAT CAP F-317 INSTALLED
     CAP CLOSURE APPLICATION TORQUE - 23 in-lbs.
  2. Package to include "H" Sealer supplied. Top to be closed and
     sealed with "T" poly tape on the top of the box, extending
     approximately 2" over each end of the box. Hazard labeling
     on the Side of Box.
  3. Shipment is responsible for applying any additional labeling to
     include but not limited to Hazard Warning Labels, proper shipping
     name, and ID number of product.
  4. All packaging components must be used to complete the total
     package in compliance with SHO Certification number as listed on
     this box.

U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

To Protect People and the Environment From the Risks of
Hazardous Materials Transportation
Shipper’s Responsibility

• § 173.22(a)(4)

  – For a DOT Specification or UN standard packaging subject to the requirements of part 178 of this subchapter, a person must perform all functions necessary to bring the package into compliance with parts 173 and 178 of this subchapter, as identified by the packaging manufacturer or subsequent distributor (for example, applying closures consistent with the manufacturer's closure instructions) in accordance with §178.2 of this subchapter...
Shipper’s Responsibility

• § 173.22(a)(4)
  – A person must maintain a copy of the manufacturer's notification, including closure instructions (see §178.2(c) of this subchapter) unless permanently embossed or printed on the packaging.

• § 173.27
  – General requirements for transportation by aircraft
UN Specification Marking Requirements  
Part 178, Subpart L

- Manufacturers test and mark packagings according to UN Standards
- Specified Codes used for marking
- Markings must be durable, legible and placed according to Subpart L
Identification Code for UN Standard Packaging

Z – PGI (minor danger)
Y – PGII (medium danger)
X – PGI (great danger)

SINGLE PACKAGING

§178.502; §178.503v
Identification Code for UN Standard Packaging

COMBINATION PACKAGING

Removable Head

Inner Packaging

UN 1A2/Z40/S/05
USA/0000
Marking Specification Packagings

- **Durable**
  - Stamped
  - Embossed
  - Burned
  - Printed or otherwise marked

- **Legible**
  - Readily visible

- **Size**
  - Relative to packaging size

- **Location**
  - On non-removable component

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§178.503(a)
Questions on Package Selection?
Markings that Communicate the Hazard

- 49 CFR Part 172 Subpart D
  Applicability
  - Each person offering a hazardous material for transportation
  - Each carrier when assigned the function by Subpart D

- General Markings that Identify the Hazardous Material Shipment
  - Proper shipping name
  - UN identification number
  - Consignee or Consignor
General Hazard Communication Markings

Proper Shipping Name
Identification Number
Orientation Arrows

Consignor/Consignee

§172.301
Orientation Arrows
Additional Hazard Communication Markings

- Technical Names – §172.301(b)
- Inhalation Hazard – §172.313(a)
- Marine Pollutant – §172.322
- RQ (Hazardous Substance) – §173.324
## Technical Names

<table>
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<tr>
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<th>(9) Quantity Limitations</th>
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</thead>
<tbody>
<tr>
<td>G</td>
<td>Flammable liquid, n.o.s.</td>
<td>3</td>
<td>UN1993</td>
<td>I</td>
<td>3</td>
<td>T11, TP1, TP27, 1B2, T7, TP1, TP8, TP28, B1, B52, IB3, T4, TP1, TP29</td>
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<td>1L, 5L, 60L</td>
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<td>III</td>
<td>3</td>
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</table>
Inhalation Hazard

Optional with label

§172.313
Hazardous Substance and Marine Pollutants

§172.322, §172.324
Additional Requirements of Subpart D

- Prohibited marking – §172-303
- Limited Quantities – §172.315
- Special Permits/Exemption – §172.301(c)
  - DOT-SP
  - DOT-E
- Authorized abbreviations – §172.308
- Class 7 (radioactive) – §172.310
- Liquid hazardous materials – §172.312
  - Combination packagings
  - Vented closures
- ORM-D – §173.316
- Explosives – §172.320
- Infectious Substance – §172.323
Column 8A Excepted Packagings

CONSUMER COMMODITIES
Display of Markings

- Durable
- English
- Affixed to surface or label, tag or sign
- Sharply contrasting background
- Un-obscured by labels or other
- Located away from other marking such as advertising
- Only authorized abbreviations

§172.304
Display of Markings

COPPER CYANIDE, RQ UN1587
HMSMRT Co.
20 Somewhere St.
Washington, DC 22059

\[ 4G/Y30/S/05/USA/0000 \]

Acrolein, stabilized
UN1092
Inhalation Hazard

Flammable liquids, n.o.s.
(contains methanol)
UN1903

Phosphoric acid solution
UN1803
Marking Questions?
Hazard Labels

- 49 CFR Part 172 Subpart E
  - Applicability
    - Each person offering a hazardous material for transportation
    - Exceptions - §172.400a

- Hazard Labels
  - Primary Hazard Class
  - Subsidiary Risk

- Other Labels
  - Cargo Aircraft Only
# Selecting Hazard Labels

<table>
<thead>
<tr>
<th>Symbols (1)</th>
<th>Hazardous Materials Descriptions and Proper Shipping Names (2)</th>
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<td>Acrolein, stabilized</td>
<td>6.1</td>
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<td>I</td>
<td>6.1, 3</td>
<td>1, B9, B14, B30, B42, B72, B77, T22, TP2, TP7, TP13, TP38, TP44</td>
<td>None</td>
<td>226 244</td>
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<tr>
<td></td>
<td>Copper cyanide</td>
<td>6.1</td>
<td>UN1587</td>
<td>II</td>
<td>6.1</td>
<td>IB8, IP2, IP4, T3, TP33</td>
<td>None</td>
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<td>G</td>
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<td>150 150 150 150 150 150 150</td>
<td>201 202 203 204 243 242 242</td>
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<tr>
<td></td>
<td>Dangerous Goods in Machinery</td>
<td>9</td>
<td>UN3363</td>
<td></td>
<td>None</td>
<td>136, A105</td>
<td>None</td>
<td>222 None</td>
</tr>
</tbody>
</table>

§172.402

To Protect People and the Environment From the Risks of Hazardous Materials Transportation
Labeling for Subsidiary Risks

Note: ALL primary AND subsidiary labels MUST have the hazard class or division number displayed on each label

§172.402
Label Restrictions

- Package contains a hazardous material
- Label represents the hazardous material inside package
- Label meets specification requirements of HMR

§172.401
Label Specifications

- **Hazard labels**
  - Design
  - Size
  - Color

- **Cargo Aircraft Only**
  - Rectangle
  - Danger

§172.407
Placement of Labels

- On package surface other than bottom
- Same surface near proper shipping name
- Affixed to tag
- Hazard labels
  - Primary and subsidiary label displayed next to each other
  - Within 6 inches
- Contrasting background
- Visible – not obscured

§172.406
Completed Examples
Label Questions?
Got A Question?
Where to Find More Information . . .

http://www.phmsa.dot.gov/hazmat
NEW: Hazardous Materials Transportation Training Modules

Free, interactive training modules available online:
http://phmsa.dot.gov/hazmat
Hazardous Material Info-Center
1-800-HMR-4922
(1-800-467-4922)
E-mail: infocntr@dot.gov

- Obtain answers to HMR questions
- Request copies of Federal Register, special permits or training materials
- Fax on Demand